SUMMARY

The studied area lies between 24^0 south to 26^0 north, Latitudes and 30^0 $27^=$ west to 30^0 $47^=$ east longitudes. This area including soils of Kharga, Genah, Bulaq and Baris. Oases.

The aim of the current investigation is to study the pedochemical characteristics of Kharga Oases soils, and find out the better land using of these soils.

To get more information on such area,twelve soil profiles were selected from the prevalent two geomorphic units namely: peneplain and pediplain.

The soil profiles were morphologically described and subjected to the physical, chemical and minerological analysis.

The obtained results could be summarized as follows:

1. The soils of El-Kharga depression can be classified according to the geomorphic unit into pediplain, peneplain and sand dunes. The frist unit has a rolling

land form with soil components of El Aguz soils and inclusion Ain El Gazal and Qasr Zaiyan soils. The second unit has been divided into three types of land forms; plat area which includes El Kharga soils ,El Gazair and Baris soils as inclusion,undulating area which include El Kharga,El Gazair and Baris soils while Ain El Gazal and Ain El Siwa soils as inclusion, and rolling area which two main soils, El Kharga and Qasr Zaiyan with El Gazair and Baris as inclusion soils.

2. Soil texture ranges widly from one profile to another,it ranges from sand to clay. The soils of profiles 7,9 and 11 are of coarse texture (sand to loamy sand), while profile 6 is clay in texture. Soils of profiles 2,3,8,10 and 12 are of medium texture class (sandy loam and sandy clay loam),and 1,4 and 5 are medium over fine texture class.

3. Sorting values indicate that the sediments are poorly sorted, moderately to moderately well sorted and well sorted sediments,suggesting that transportation and deposition of parent material either take place by water action or formed by wind with little action and / or formed under both water and wind action.
Skewness values indicate that the studied soils are

commonly positively skewed.

Kurtosis values are usually more than 0.59 (very platy kurtic, Mesokurtic, Leptokurtic and very Leptokurtic) indicating that the sediments have coarse mode with less fine mode.

Appling the discirminant functions of Sahu (1964) reveals that the sediments forming the investigating soils are mostly deposited under aqueous environments.

4. The obtained results of soil physical and charactreristics of the area under study , i.e , field capacity, wilting point and available water show a close relationship with clay and soluble salts content,through their direct influence on the formation.

5. Soil salinity differs appreciably from one profiles to another or throughout the profile layers. Ec ranged between 0.6 and 104.9 m.mhos/cm.,profiles 4,7,8,9,10 and 11 are non-saline throughout the whole profile layers,profiles 1,5 and 6 are moderately saline. Profiles 2,3 and 12 are extermely saline throughout the different layers.

6. Soluble cations are dominated by Na^{+} followed by Ca^{++} and Mg^{++} while K^{+} is the least abundant except for profiles 5,8 and 11 where Ca^{++} and / or Mg^{++} exceeds Na^{+}. Solubles anions are generally follow the order $Cl^{-} > SO_4^{--} > HCO_3^{-}$.

7. Soil reaction (PH) ranged between 7.3 and 8.6 indicated that the studied soils are slightly to moderately alkaline.

8. Total carbonate content varies widely from one profile to another. Its ranges from 0.86 to 28.87 %; this indicates non calcarous to highly calcarous nature of soils. This is mainly due to the difference of soil relief,soil sediment types and their environmental condition of sedimentation.

9. Gypsum content are generally low,it ranges from 0.01 to 3.39%, whereas profile 3 having the highest contenty.

10. Organic matter content is generally very low in all profile layers except for the surface layers of the cultivated soils ,owing to the prevailing aridity of the region and its scanty vegetation.

11. Cation exchange capacity ranges between 3.87 and 49.1

meq/100 g soils. The highest values are found in the fine texture soils, while the lowest values are found in the croase texture soils.

With regard to the exchangeable cations, Ca^{++} is show the predominate followed by Mg^{++} and Na^{+} ,while the exchangeable K^{+} represents the lowest one.

12. X-ray diffraction analysis indicates that Kaolinite is the predominant clay minerals in the coarse clay fraction and the total clay fraction which found in the soils of El-Kharga Oasis specially in the northern parts, followed by sepiolite,montmorillonite and vermiculite with few accesory minerals (quartz and feldspars.).

Montmorillonite and vermiculite are the main clay minerals in the fine clay fraction and total clay fraction which are presented in the soils of Baris, Bolaq and Genah Oases in the midle and southern parts of the depression, followed by sepiolite, palygorskite, interstratified minerals, hydrous mica, quartz and feldspare.

13. Amorphous inorganic materials content are ranged between 1.72 and 4.44 %. Broadly iron is the most abundant, followed by silica and alumina. The molar

ratio: rangs widly between 0.42 and 10.86 .

14. The coefficient of linear extensibility "COLE," shows high values were cbserved for montmorillonitic soils with high clay content.

15. Based on the soil morphological, physical, chemical and mineralogical properties, the soils were classified according to "soil taxonomy (1975), indicated that most of the studied soils are related to the order" Entisols, suborder Orthents and psamments.

On the family level, six families are distinguished.

a. Typic torriorthents, sand over fine loamy, mixed, hyperthermic is recognized in the soils of profiles 5 and 12.

b. Vertic torriorthents, clayey, mixed hyperthermic is found in the soils of profile 6.

c. Typic torriorthents, fine loamy over sand, mixed, hyperthermic is found in the soils of profile 2 .

d. Typic torriorthents, sandy, mixed, hyperthermic is present in the profiles of 7 and 9 .

e. Typic torriorthents, fine loamy, mixed, hyperthermic is found in the soils of profiles 1,3,4,8 and 10.

f. Typic, torripsamments, mixed, hyperthermic is found in the soils of profiles 11.

16. land capability classification of El-Kharga soils from the agricultural point of view, soil productivity of this area has been classified according to "USDA" system into four classes:

a. Class II, soils of peneplain with an area of about 321524 feddan, can be cultivated with most of field crops, orchards, and range. It needs little soil conservation.

b. Class III soil of peneplain with an area of about 386571 feddan, can be cultivated with some field crop, fruit trees and pasture. It needs improving of the water holding capacity, fertility, drainage of the heavy soils and stabilization of moving sand dune toward it.

c. Class VI Soils of peneplain with an area of about 21310 feddans, it is unsuitable to the common cultivation and more suitable for pasture with leaching salts axcess

from the soils and protect the soils from the creeping of sand dunes and wind erosion.

d. Class VII Soils of pediplain with an area of about 233690 feddans. It is not suitable for any agriculture purposes.